

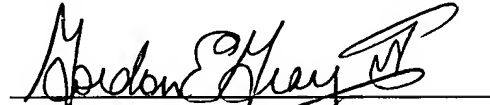
1 39. The device comprising a combination of a piston and a chamber according
2 to claim 37, wherein the piston and/or the chamber comprise supporting means.

REMARKS

This is a Section 371 national application based on International Application No. PCT/DK99/00227, filed April 22, 1999. The PCT application was unintentionally abandoned by Applicant but is revived by a petition and appropriate fee filed herewith.

The amendments to Claims 1-39 are to conform the claims to United States practice. If the Examiner believes that a telephone interview will help further the prosecution of this case, Applicant respectfully requests that the undersigned attorney be contacted at the listed telephone number.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE**IN THE SPECIFICATION:**

Please insert the statement of priority above the "TECHNICAL FIELD" as follows:

This is a Section 371 national patent application based on International Application No. PCT/DK99/00227, filed on April 22, 1999. International Application No. PCT/DK99/00227 is incorporated herein by reference.

IN THE CLAIMS:

Please amend Claims 1-39 as follows:

What is claimed is:

1 1. A device comprising a combination of a chamber and a piston positioned
2 inside the chamber, said chamber and said piston relatively movable to each other in a
3 predetermined direction of movement between a first position and a second position,
4 wherein [characterized by the fact that],

5 the cross-section of the chamber [(1, 21, 60, 70, 90, 169, 216, 231)] in a
6 plane perpendicular to the direction of movement is larger at the first position than at the
7 second position;

8 the change [(16, 17, 18, 66, 67, 68, 69, 72, 74, 151, 153, 160, 161)] of the
9 cross-section of the chamber [(1, 21, 60, 70, 90, 169, 216, 231)] is essentially continuous
10 between the first position and the second position; and,

11 the cross-section of the piston [(20, 20', 36, 36', 49, 49', 50, 50', 59, 59', 76, 76',
12 92, 92', 118, 118', 138, 138', 146, 146', 168, 168', 189, 189', 208, 208', 222, 222', 222'')]
13 is arranged to adapt itself to the cross-section of the chamber [(1, 21, 60, 70, 90, 169, 216,
14 231)].

1 2. A device comprising a combination of a chamber and a piston positioned
2 inside the chamber, the chamber and the piston relatively movable to each other in a
3 predetermined direction of movement between a first position and a second position,

4 [characterized by the fact that] wherein,

5 [-] the cross-section of the piston [(230)] in a plane perpendicular to the direction of
6 movement is larger at a first piston position than at a second piston position,

7 [-] the change of the cross-section of the piston [(230)] is essentially continuous
8 between the first piston position and the second piston position,

9 [-] the cross-section of the chamber [(231)] in a plane perpendicular to the direction
10 of movement is larger at the first position than at the second position,

11 [-] the change of the cross-section of the chamber is essentially continuous between
12 the first position and the second position and

13 [-] the cross-section of the chamber [(231)] is arranged to adapt itself to the cross-
14 section of the piston [(230)].

1 3. A device comprising a combination of a chamber and a piston positioned
2 inside the chamber, said chamber and said piston relatively movable to each other in a
3 predetermined direction of movement between a first position and a second position,

4 [characterized by the fact that] wherein

5 [-] the cross-section of the piston [(20, 20', 36, 36', 49, 49', 50, 50', 59, 59', 76, 76',
6 92, 92', 118, 118', 138, 138', 146, 146', 168, 168', 189, 189', 208, 208', 222, 222',
7 222'')] in a plane perpendicular to the direction of movement is larger at a first piston
8 position than at a second piston position,

9 [-] the change of the cross-section of the piston [(20, 20', 36, 36', 49, 49', 50, 50', 59,
10 59', 76, 76', 92, 92', 118, 118', 138, 138', 146, 146', 168, 168', 189, 189', 208, 208', 222,
11 222', 222'')] is essentially continuous between the first piston position and the second
12 piston position,

13 [-] the cross-section of the chamber [(231)] in a plane perpendicular to the direction
14 of movement is larger at the first position than at the second position,

15 [-] the change of the cross-section of the chamber [(231)] is essentially continuous
16 between the first position and the second position and

17 [-] a cross-section of the chamber [(231)] and the piston [(20, 20', 36, 36', 49, 49', 50,
18 50, 59, 59', 76, 76', 92, 92', 118, 118', 138, 138', 146, 146', 168, 168', 189, 189', 208,
19 208', 222, 222', 222'')] respectively is arranged to adapt itself to the cross-section of the

20 piston [(20, 20', 36, 36', 49, 49', 50, 50', 59, 59', 76, 76', 92, 92', 118, 118', 138, 138', 146,
21 146', 168, 168', 189, 189', 208, 208', 222, 222', 222'')] and the chamber [(231)],
22 respectively.

1 4. The [A] device comprising a combination of a chamber and a piston of
2 Claim 1 [according to claim 1, 2 or 3 characterized by the fact that] wherein the
3 circumference of the cross-section perpendicular to the direction of movement of the
4 chamber [(162)] and/or the piston [(163)] where [at] at least one part of said chamber
5 and/or said piston, is constant between and including said first position and said second
6 position.

1 5. The [A] device comprising a combination of a chamber and a piston according to
2 claim 4, [characterized by the fact that] wherein said cross-section
3 [-] consisting of sectors [(152, 154)], wherein in each sector the distance between the
4 centerpoint of the cross-section of the chamber [(162)] and the outermost limiting surface
5 of the chamber is larger than the corresponding distance measured along a line separating
6 the sector from an adjacent sector, and
7 [-] the change [(151, 153)] of the shape between two adjacent sectors is essentially
8 continuous.

1 6. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3, characterized by the fact that] wherein the cross-section of
3 the chamber [(1, 21, 60, 70, 90, 169, 216, 231)] is circular at any point between and
4 including the said first position and second position.

1 7. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3, characterized by the fact that] wherein the piston comprises
3 a sealing portion [(8, 8', 20, 20', 25, 25', 36, 36', 40, 40', 41, 41', 48, 49, 49', 50, 50', 58,
4 59, 59', 76, 76', 80, 80', 83, 92, 92', 102, 102', 112, 117, 118, 118', 129, 133, 138, 138',
5 146, 146', 167, 167', 168, 168', 185, 188, 189, 189', 198, 198', 208, 208', 209, 220, 220',
6 222, 222', 222'', 235)] made of an elastically deformable material and/or a loading portion
7 [(9, 9', 31, 42, 51, 54, 54', 100, 101, 103', 124, 124', 130, 131, 136, 137, 173, 173', 174,

8 174', 181, 205, 205', 206, 215, 215', 219, 219', 232, 233, 237)) and/or a support portion
9 [(10, 28, 31, 42, 43, 84, 184)].

1 8. The [A] device comprising a combination of a chamber and a piston
2 [Piston] according to claim 7, [characterized by the fact that] wherein the sealing portion
3 [(8, 8', 25, 185, 209, 79, 80, 80', 130, 131, 132, 133, 170, 171, 172, 190)] in cross-section
4 of the piston [(20, 20', 36, 36', 59, 59', 76, 76', 189, 189', 146, 146', 168, 168', 208, 208',
5 222, 222', 222'')] parallel to the direction of movement has a general form of an area
6 which is bound by a curve and/or line with specific predetermined mathematical
7 characteristics in which the said adaptation of the cross-section of said piston in a plane
8 perpendicular to the direction of movement corresponds to a change in a value of a
9 characteristic in a direction perpendicular and/or in a direction of the movement of said
10 piston and/or said chamber [(1, 21, 60, 70, 90, 162, 169, 216, 231)].

1 9. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion [(25)] in
3 a cross-section of the piston [(36, 36')] in a plane parallel to the direction of movement
4 has the general form of an area bounded by a rectangular having a predetermined length
5 of its sides, in which the said adaptation of the cross-section of the piston [(36, 36')] in a
6 plane perpendicular to the direction of movement corresponds to a change in the length of
7 a side of said rectangular perpendicular to the direction of movement and is accompanied
8 by an opposite change in the length of a side along the direction of movement.

1 10. The [A] device comprising a combination of a chamber and a piston
2 according to claim 9, [characterized by the fact that] wherein the change of the length of
3 said side along the direction of movement is accompanied by a change in the shape of
4 said rectangular.

1 11. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion [(8, 8',
3 80, 80', 185, 209)] in a cross-section of the piston [(20, 20', 59, 59', 189, 189'')] in a plane
4 parallel to the direction of movement has the general form of the obliques of a triangle of

5 which its [perpendicular] perpendicular being parallel with the direction of movement, the
6 obliques of [the] said triangle extending outwards from [the] said [perpendicular]
7 perpendicular in a predetermined angle (α_1, ϵ_1) wherein the said adaptation of the cross-
8 section of the piston [(20, 20', 59, 59', 189, 189')] in a plane perpendicular to the direction
9 of movement corresponds to a change in the said predetermined angle (α_2, ϵ_2).

1 12. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion [(79,
3 80)] in a cross-section of the piston [(76, 76')] a plane parallel to the direction of
4 movement has the general form of an area which is bound by [a] approximately a triangle,
5 a [perpendicular] perpendicular being parallel to the direction of movement and the
6 obliques of the said triangle extending outwards from [the] said [perpendicular]
7 perpendicular in a predetermined angle ϕ_1 , wherein [the] said adaptation of the cross-
8 section of the piston in a plane perpendicular to the direction of movement corresponds to
9 a change in the said predetermined angle ϕ_2 .

1 13. The [A] device comprising a combination of a chamber and a piston
2 according to claim 11 [or 12], [characterized by the fact that] wherein [the] said
3 predefined angle ($\alpha_1, \epsilon_1, \phi_2$) is larger at the first position than at [the] said second position.

1 14. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion [(130,
3 131, 132, 133, 170, 171, 172, 190)] in a cross-section of the piston [(146, 146', 168, 168',
4 208, 208')] in a plane parallel to the direction of movement has the general form of an
5 area which is bound by a circle having a predetermined radius, a central axis parallel to
6 the direction of movement and, wherein the said adaptation of the cross-section of the
7 piston [(146, 146', 168, 168', 208, 208')] in a plane perpendicular to the direction of
8 movement corresponds to a change in the said radius.

1 15. The [A] device comprising a combination of a chamber and a piston
2 according to claim 14, [characterized by the fact that] wherein [the] said adaptation is
3 accompanied by an opposite change of the radius in the direction of movement.

1 16. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion in a
3 cross-section of the piston [(222, 222', 222'')] in a plane parallel to the direction of
4 movement has the general form of an area which is bounded by a rhomboid, which has a
5 predetermined length of its axis, one of the axis parallel to the direction of movement,
6 wherein said adaptation of the cross-section of the piston in a plane perpendicular to the
7 direction of movement corresponds with a change in the length of an axis and an opposite
8 change in the length of the other axis.

1 17. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion in a
3 cross-section of the piston [(222, 222', 222'')] in a plane parallel to the direction of
4 movement has the general form of an area which is bounded by an ellipse, which has a
5 predetermined length of its axes [axes], one [of the] axis parallel to the direction of
6 movement, wherein said adaptation of the cross-section of the piston in a plane
7 perpendicular to the direction of movement corresponds with a change in the length of an
8 axis and an opposite change in the length of the other axis.

1 18. The [A] device comprising a combination of a chamber and a piston
2 according to claim 8, [characterized by the fact that] wherein the sealing portion in a
3 cross-section of the piston [(92, 92')] in a plane parallel to the direction of movement
4 comprises parts (X, Y, Z) which are preformed, having in between predetermined angles
5 (k_1, λ) where said part X having a predetermined angle η_1 with the direction of movement
6 wherein said adaptation of the cross-section of the piston in a plane perpendicular to the
7 direction of movement corresponds with a change in said angles (k_2, η_2).

1 19. The [A] device comprising a combination of a chamber and a piston
2 according to claim 7, [characterized by the fact that] wherein said sealing portion
3 comprise a sealing edge [(48, 58, 83, 102, 102', 117, 129, 167, 167', 188, 198, 198', 220,
4 220', 235)] which is engaging the wall [(2, 3, 4, 5, 61, 62, 63, 64, 65, 155, 156, 157, 158,
5 207, 238)] of said chamber [(1, 21, 60, 70, 90, 169, 216, 231)], wherein said adaptation

6 additionally is accompanied by a change in the size and/or shape of said sealing edge
7 under the influence of said loading means.

1 20. The [A] device comprising a combination of a chamber and a piston
2 according to claim 19, [characterized by the fact that] wherein said loading means
3 provides a spring-force to the sealing edge [(48, 58, 83, 102, 102', 117, 129, 167, 167',
4 188, 198, 198', 220, 220', 235)] so that said piston [(20, 20', 36, 36', 49, 49', 50, 50', 59,
5 59', 76, 76', 92, 92', 118, 118', 138, 138', 146, 146', 168, 168', 189, 189', 208, 208', 222,
6 222', 222'')] engages the wall [(2, 3, 4, 5, 61, 62, 63, 64, 65, 155, 156, 157, 158, 207,
7 238)] of the chamber [(1, 21, 60, 70, 90, 169, 216, 231)] with a sealing force.

1 21. The [A] device comprising a combination of a chamber and a piston
2 according to claim 20, [characterized by the fact that] wherein said loading means
3 comprise:
4 [-] a medium [(103, 103', 124, 124, 136, 137, 173, 173', 174, 174', 205, 205', 206,
5 215, 215', 219', 232, 233, 237)],
6 [-] a layer of fibers [(111, 130, 171)] which can freely shear over each other or a layer
7 of a reinforcement [(51, 100)],
8 [-] said fibers are embedded in a skin [(110, 110', 170, 170')] made of rubber or a
9 thermoplast,
10 [-] positioned inside said piston [(92, 92', 146, 146', 168, 168', 208, 208', 222, 222',
11 222'')] and/or inside the wall [(238)] of the chamber [(231)] which has a predetermined
12 pressure at said first position, and which can have a different pressure at said second
13 position.

1 22. The [A] device comprising a combination of a chamber and a piston
2 according to claim 19 [or 20] in which [the] said piston is connected to the piston rod for
3 moving the piston in the direction of movement [characterized by the fact that] wherein
4 said piston [(92, 146, 168, 208, 222)] and/or said chamber [(231)] comprise loading
5 regulating means [(103, 110, 123, 124, 125, 126, 127, 137, 138, 139, 140, 141, 145, 170,
6 173, 177, 178, 179, 199, 200, 201, 206, 215, 223, 224, 232)] providing a sealing force

7 [-] which adjusts [adjust] itself so that the sealing edge [(102, 102', 129, 129', 167,
8 167', 198, 198', 220, 220' 235)] seals against the wall of the chamber during said
9 movement between and including said first position and said second position, and

10 [-] said sealing force depends on the relative position of said piston and said chamber
11 and/or on the pressure of a medium in the chamber, and/or the operating force, and/or a
12 spring-force.

1 23. The [A] device comprising a combination of a chamber and a piston
2 according to claim 22 in which [the] said piston is connected to a piston rod for moving
3 the piston in the direction of movement, [characterized by the fact that] wherein

4 [-] the piston rod [(120, 195)] of the piston [(146, 208)] comprises a channel [(125)]
5 which is connected by a hole [(123, 199, 200, 201)] in the wall of said piston rod to a
6 medium [(124, 205, 206)] of the piston [(146,208)], so that a medium can be conducted
7 through said hole [(123, 199, 200, 201)],

8 [-] said channel [(125)] comprises a piston [(126)] which is engaging said medium by
9 a spring-force.

1 24. The [A] device comprising a combination of a chamber and a piston
2 according to claim 22 in which [the] said piston is connected to a piston rod for moving
3 the piston in the direction of movement, [characterized by the fact that] wherein,

4 [-] the piston rod [(140)] of said piston comprises a channel which is connected by a
5 hole [(199, 200, 201)] in the wall of said piston rod to a medium [(136, 137)] of the
6 piston, so that a medium can be conducted through said hole [(199, 200, 201)],

7 [-] a cap which is connecting the piston to said piston rod [(140)] comprises a stop
8 [(145)] for preventing said piston to disassemble from said piston rod [(140)], and

9 [-] said channel comprises a piston [(138)] which is engaging said medium [(136,
10 137)] by the operational force.

1 25. The [A] device comprising a combination of a chamber and a piston
2 according to claim 22 in which [the] said piston is connected to a piston rod for moving
3 the piston in the direction of movement, [characterized by the fact that] wherein
4 [-] the piston rod [(224)] of the piston [(222)] comprises a channel [(221)] which is
5 connected by a hole in the wall of said piston rod to a medium [(215, 219)] of the piston
6 [(222)], so that a medium can be conducted through said hole,
7 [-] said channel [(221)] comprises a piston [(149)] which is engaging said medium by
8 a spring-force of a piston [(148)] which is connected by a piston rod [(217)], and which is
9 engaged by a medium in the chamber [(216)].

1 26. The [A] device comprising a combination of a piston and a chamber
2 according to claim 1[, 2 or 3] in which the said piston is connected to the piston rod for
3 moving the piston in the direction of movement, [characterized by the fact that] wherein
4 said piston [(168, 168', 208, 208', 222, 222', 222'')] and/or chamber [(231)] comprise
5 shape regulating means [(177, 179, 191, 192, 202, 203, 196, 197, 211, 212, 213, 214)].

1 27. The [A] device comprising a combination of a piston and a chamber
2 according to claim 26, [characterized by the fact that] wherein,
3 [-] a cap [(177, 191, 192, 211, 212, 213, 214)] is movable over the piston rod [(176,
4 195, 224)] in a predetermined direction,
5 [-] defined by a stop [(196, 197)] or a cap [(175)] which is fastened to the piston rod
6 [(176)],
7 [-] a sealing device [(172)] and/or an impervious layer [(190)] which is tightly
8 squeezed between the skin [(170)] and said caps [(191, 192, 211, 212, 213, 214)] and
9 sealing device [(202, 203)] prevent the medium or media to escape from the piston [(168,
10 168', 208, 208', 222, 222', 222'')].

1 28. The [A] device comprising a combination of a piston and a chamber
2 according to claim 27, [characterized by the fact that] said movement is [-] damped by a
3 spring [(178)], and [-] is limited by a stop [(179)].

1 29. The [A] combination of a piston and a chamber according to claim 1[, 2 or
2 3] in which [the] said piston is connected to a piston rod for moving the piston in the
3 direction of movement, [characterized by the fact that] wherein: [the]

4 [-] the piston rod [(6, 23)] comprises an inlet and a channel [(191)] for conducting
5 pumped gaseous and/or liquid media into the chamber [(1, 21, 60, 70, 231)], and

6 [-] the piston rod [(6, 23)] further comprises a valve [(13)] for preventing the pumped
7 gaseous and/or liquid media from escaping the chamber [(1, 21, 60, 70, 231)] through
8 [the] said channel [(12)].

1 30. The [A] combination of a piston and a chamber according to claim 1[, 2 or
2 3 characterized by the fact that] wherein:

3 [-] the chamber [(90)] comprises [comprise] an inlet channel [(94)] for conducting
4 pumped gaseous and/or liquid media into said chamber [(90)], wherein said inlet channel
5 [(96)] comprises a valve for preventing the pumped gaseous and/or liquid media from
6 escaping the chamber through said inlet channel [(91)].

1 31. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3,] in which the chamber comprises an outlet channel and/or
3 an inlet channel for conducting pumped gaseous and/or liquid media out of the chamber,
4 [characterized by the fact that] wherein the second position is closer to the outlet channel
5 [(14, 77, 93)] than the first position, so that the cross-section of the chamber [(1, 21, 60,
6 70, 90, 162, 169, 216, 231)] diminishes from the first position towards the second
7 position.

1 32. The [A] device comprising a combination of a chamber and a piston
2 according to claim 31, [characterized by the fact that] wherein said outlet channel [(93)]
3 comprises a valve for preventing the pumped gaseous and/or liquid media to be
4 conducted into said chamber.

1 33. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3] in which [the] said piston is connected to a piston rod for
3 moving the piston in the direction of movement, characterized by the fact that said
4 chamber is closed and comprises a medium which is [non-compressable] non-
5 compressible, while said piston comprises valve means for conducting the said medium.

1 34. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3] in which said piston is connected to a piston rod for moving
3 the piston in the direction of movement, [characterized by the fact that] wherein said
4 chamber is closed and comprises a medium which is compressible [compressable]
5 between said piston and a wall of said chamber.

1 35. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3] in which said piston is connected to a piston rod for moving
3 the piston in the direction of movement, [characterized by the fact that] wherein said
4 device comprises valve means and valve regulating means in order to selectively conduct
5 a medium in or out of the space between said piston and said chamber.

1 36. The [A] device comprising a combination of a chamber and a piston
2 according to claim 1[, 2 or 3] in which said piston is connected to a piston rod for moving
3 the piston in the direction of movement, [characterized by the fact that] wherein said
4 chamber or said piston is connected to an axis in order to transform the translation of the
5 piston and/or the chamber into a rotation, where the chamber comprises valve means and
6 valve regulating means for selectively conducting and not conducting a medium to the
7 space between the said piston and said chamber in order to move said chamber and/or
8 piston.

1 37. The [A] device comprising a combination of a piston and a chamber
2 according to claim 22 [characterized by the fact that] wherein the pressure inside the
3 piston and/or inside the wall of the chamber is higher, equal or lower than the pressure in
4 the chamber.

1 38. The [A] device comprising a combination of a piston and a chamber
2 according to claim 22, [characterized by the fact that] wherein the pressure inside the
3 piston is higher, equal or lower than the pressure in the wall of the chamber.

1 39. The [A] device comprising a combination of a piston and a chamber
2 according to claim 37 [or 38], [characterized by the fact that] wherein the piston and/or
3 the chamber comprise supporting means.